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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/643,717 | 08/19/2003 | Satoshi Yanagisawa | | 4701 |

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EXAMINER

ANDUJAR, LEONARDO

ART UNIT PAPER NUMBER

2826

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/643,717

Applicant(s)

YANAGISAWA, SATOSHI

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 3,8-11,13,14,16,17,20,24-27,29,30,32 and 33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,12,15,18,19,21-23,28 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species 1 (claims 1, 2, 4-7, 12, 15, 18, 19, 21-23, 28 and 31 in the reply filed on 03/11/2005 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4-7, 12, 15, 18, 19, 21-23, 28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hori (US 6,469,398) in view of Aono et al. (US 5,521,429).
4. Regarding claims 1 and 18, Hori (e.g. figs. 1-4) shows a semiconductor device comprising: a semiconductor chip 2 including a first and second principal surfaces, a first electrode 7a formed on the first principal surface and a second electrode 16 formed in the second principal surface; a first lead frame 11 including a first heat sink portion or "first connection portion" (the portion overlapping the chip) connected to the first terminal portion and second lead frame 6 including a second heat portion or "second connecting portion" (the portion overlapping the chip) connected to the second electrode and second terminal portion; and a housing 5 sealing the semiconductor chip and being formed not to cover part of surfaces of the first heat portion. Also, the first and second connection portions are conductive and plate shaped (col. 1/lis. 27-37). Hori does not

teach that the second heat sink portion is exposed from the sealing. Nevertheless, Aono (e.g. fig. 2A) teaches a lead frame 26 that includes a heat sink portion 25 exposed from the resin package 24. According to Aono, this type of embodiment improves the heat dissipation of the package (col. 5/lls. 61-67 & col. 6/lls. 1-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the first lead disclosed by Hori having a heat sink portion exposed from the sealing to improve the package heat dissipation as taught by Aono.

5. Regarding claims 2 and 19, Hori shows that the first and second terminal portions are unified with the first and second heat sink portions from which the first and second terminal portion extends, respectively.

6. Regarding claims 4 and 21, Hori shows that the first and second electrodes are directly connected to the first and second heat sink portions respectively.

7. Regarding claim 5, Hori shows that the first and second heat sink portions are composed of conductive plates (col. 1/lls. 27-37). Also, Aono teaches that the heat sink portions are made of metal (col. 1/ll. 14).

8. Regarding claims 6 and 22, Aono shows that the each of the leads may includes a heat sink wherein the thickness of the heat sink portions 28 are greater than the thickness of the terminals portions 22 (e.g. fig. 2B; col. 5/lls. 61-67 & col. 6/lls. 1-7).

9. Regarding claims 7 and 23, Hori teaches that the lead frame comprises copper (col. 1/lls. 27-37).

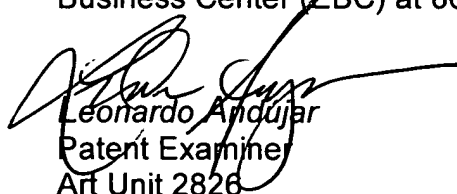
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10. Regarding claims 12 and 28, Hori (e.g. fig. 1A) teaches a third electrode 7b on the first principal surface and a third lead frame 12 including a top plate portion connected to the third electrode and a terminal portion.

11. Regarding claims 15 and 31, Hori teaches that the lead frame comprises copper (col. 1/lls. 27-37).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Leonardo Andújar
Patent Examiner
Art Unit 2826
04/25/2005